



MVDL

MONTANA VETERINARY DIAGNOSTIC LABORATORY

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Accession #: 8-41-16

Owner: FT BELKNAP BUFFALO

Species: WILD - BISON

Breed: NA

Name/No. BISON

Age: **Sex:** F

Date Sent: 09/01/2015

Date Received: 07/10/2015

Submitter: BROCK T. AITON, D.V.M.

PO BOX 399

CHINOOK MT 59523

Final Report

Case Coordinator: AWL

CASE SUMMARY

REASON FOR SUBMISSION: Bison death

LABORATORY DIAGNOSIS:

See case 8-24-16

ENVIRONMENTAL QUALITY
COUNCIL. 2015-16

September 9, 2015

Exhibit 16

COMMENT:

Case summary; MVDL Cases 8-24-16 and 8-41-16 and MVDL Case 16-1587

The death loss of 20 bison occurring in the short time interval of 7 days suggests a highly infectious disease or a toxicosis had occurred. The 2 animal samples examine revealed that both had a necrotizing pneumonia but the only pulmonary pathogen isolated was *Trueperella* sp. and that was as part of a mixed insignificant bacterial population. This organism would not have resulted in the death loss of the number reported in such a short time span. Multiple attempts to identify *Bacillus anthracis* were conducted including culture, lateral flow test and PCR. All tests were negative for *Bacillus anthracis* infection (anthrax). From the review of the tissues and cultures, there is no evidence that an significant infectious disease was the direct result of the death of these 20 bison. The pneumonia is likely to be due to aspiration.

Toxicology testing was performed at Michigan State University, Montana State Analytical Laboratory and University of Pennsylvania. Heavy metal, GC/MS organic chemical screening and botulism testing was unremarkable. Poisonous plants were not identified in the pasture (per Mark Azure). Blue-green algae was not identified in water samples and a bloom had not been reported. Sodium concentration of the brain of animal 8-24-16 was 1864 ppm (high normal-1600ppm, toxic greater than 2000ppm in cattle and swine).

Two originally submitted water samples had low TDS and nitrates. However, the samples were from water that was imported after the death loss had started and from standing water in a dry reservoir after a recent range storm. On 8-24-15, water samples from the well itself and an off properly reservoir were submitted. The well water samples TDS values were 3500 and 3600 ppm which is elevated but still acceptable for livestock. The reservoir water values were very low.

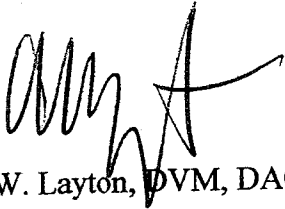
The death loss coincided with an electrical malfunction of the well pump sometime between July 2 to July 4 and animals had been estimated to be without water for up to 36 hours. Death loss abated after restoration of water availability. Per conversations with the veterinarians who performed the necropsies there were no observations that would suggest the animals were dehydrated (ie sunken eyeballs, dry tissues) to incriminate prolong water deprivation. Salt toxicosis can occur in multiple species of animals and is the result of high salt intake and decreased water availability. Animals with adequate water availability can tolerate high levels of salt in the diet. But if water is deprived, osmotic gradient fluctuations can occur within tissues (especially the brain) and influx of fluid can occur into these tissues after water availability is restored. The influx of fluid into the brain can

cc: Aiton/Baxter & Woerner 9-2-15
no mail 1/16

CASE SUMMARY

result in cerebral edema and neurologic signs could ensue that could have interfered with swallowing, laryngeal response, or even prevention of ruminal reflux. Loss of these functions could result in aspiration and the necrotizing pneumonias identified grossly and histologically in the two animals evaluated.

Salt toxicosis in this case is a diagnosis based on rule out of other causes of significant sudden death loss in association with the history of water deprivation, discussion of field observation with the attending veterinarians and tribal members, the elevated brain sodium level when compared to cattle and swine, the elevated TDS in the water and the abatement of the death loss after water availability was restored.



A. W. Layton, DVM, DACVP\mmm

Date In: 07/14/2015

PATHOLOGY

Date Out: 09/01/2015

Released by: AWL

Tissues were received on 7/10/15 in a fresh state. All tissues were cut in for histologic evaluation and inventoried.

SUBGROSS: Sub-grossly, the lungs are purple/black with tan coalescing foci. Lungs are slightly firm. Liver has yellow/red surfaces.

HISTOPATHOLOGY: Tissue sections of placentome and uterus, kidney, intestine, urinary bladder, liver, heart, skeletal muscle and lung are examined. There is a severe necrotizing bronchopneumonia as characterized by multifocally bronchioles being filled by degenerate material, karyorrhectic debris and bacterial colonies. The epithelium is absent in many of these. The adjacent alveoli contain fibrin, edema and variable numbers and concentrations of neutrophils, alveolar histiocytes and erythrocytes. Septa are congested and thickened. In other areas, the parenchyma is effaced by neutrophils and bacterial colonies. Interlobular septa are edematous and contain fibrinous thrombi and infiltrated with variable numbers of inflammatory cells. B&B gram stain revealed the bacteria to be predominantly gram positive cocci. Large bacterial rods colonize the kidney multifocally (postmortem overgrowth). Numerous sarcocysts occur within cardiac myofibers. Hepatocytes are swollen with fibrillar to vacuolated cytoplasm. Focally within the liver, there are biliary hyperplasia.

MORPHOLOGIC DIAGNOSIS:

Bronchopneumonia, necrotizing, intralesional bacterial cocci
Lipid change and vacuolar change, liver

Date In: 07/10/2015

BACTERIOLOGY

Date Out: 07/20/2015 Released by: hd

CULTURES

Antimicrobial
Profile

Site

Specimen

Culture Type

Isolate

Growth



MVDL

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Accession #: 8-24-16

Owner: FT BELKNAP BISON HERD

Species: WILD - BISON

Breed: BISON

Date Sent: 09/01/2015

Date Received: 07/08/2015

Name/No. 1158

Age: ADULT **Sex:** M

Submitter: D. E. WOERNER D.V.M.

1310 ALLENDALE RD

LAUREL MT 59044

Final Report

Case Coordinator: AWL

CASE SUMMARY

REASON FOR SUBMISSION: Bison death

LABORATORY DIAGNOSIS:

Water deprivation/probable salt toxicosis

Necrotizing pneumonia, E. coli isolated

COMMENT: See Case 8-41-16.


A. W. Layton, DVM, DACVP\mmm

Date In: 07/09/2015

PATHOLOGY

Date Out: 09/01/2015

Released by: AWL

8-24-16 ADDITIONAL INFORMATION:

BOTULISM TESTING: (University of Pennsylvania): Rumen contents were negative for Types ABC Botulism by PCR.

D. J. Marshall, BVSc, PhD/jmm

HISTOPATHOLOGY: Tissues from kidney, fat, mammary gland, heart, skeletal muscle, spleen, lung (two sections), cerebrum and mid-brain, liver, rumen and intestine are examined. Many of the tissues are in an advanced state of autolysis, precluding accurate histologic assessment. Postmortem bacteria occur throughout all sections. In one section of lung, multifocally there are areas of inflammatory infiltrate containing karyorrhectic debris and bacterial colonies. In some of these areas, there is necrosis and destruction of normal parenchymal architecture and fibrin exudation occurs within interlobular septa. Necrotic cells, inflammatory cells and bacterial colonies occur within one large bronchiole. Gram stain revealed a mixed bacterial population.

MORPHOLOGIC DIAGNOSIS:

bronchopneumonia, necrotizing, acute, one section of lung
autolysis, severe, all tissues

CC: Aston/Baxter 8-24-16
Woerner
Werner

Submitter:
D. E. WOERNER D.V.M.

Owner:
FT BELKNAP BISON HERD

Date In: 07/09/2015

BACTERIOLOGY

Date Out: 07/13/2015 Released by: hd

CULTURES

Site	Specimen	Culture Type	Isolate	Antimicrobial	
				Growth	Profile
	lung	Aerobic	<i>Escherichia coli</i>	3+ M	NA
	spleen	Aerobic	No Growth		NA

+ to 4+ = rare colony to confluent growth
= pure culture, M = mixed or partially contaminated culture

OTHER TESTS

Source	Specimen	Test Name	Result
	water	Blue-Green Algae Exam	Negative

Direct examination of the water revealed no Blue-Green Algae.

Date In: 07/09/2015

REFERRAL/OTHER

Date Out: 09/01/2015 Released by: AWL

Animal ID	Specimen	Test	Result	Ref Inst.
1158	Liver	GCMS	See attached results.	MICH ST U
1158	Liver	Trace Min	See attached results.	MICH ST U
1158	Brain	Sodium level	See attached results.	MICH ST U
1158	Rumen contents	Botulism	See attached results.	Pennsylvania
ond Water	Water	Water Analysis	See attached results.	Analytical MSU
ank Water	Water	Water Analysis	See attached results.	Analytical MSU

Please see attached report for complete results.